

INTEGRATED CUTTING TOOL FOR WASTE DISPOSAL APPARATUS

FIELD OF INVENTION

[0001] The present invention relates generally to a waste disposal apparatus and a method for disposing waste material. More particularly, the present invention is directed to an apparatus having a cutting tool integrated with a mechanism for sealing a tubular sealing material containing waste, and to a method of using the waste disposal apparatus.

BACKGROUND OF INVENTION

[0002] Conventional waste disposal devices and systems are generally available to dispose waste ranging from kitchen refuse to soiled diapers. Most waste receptacles require separate and numerous actions for packing waste and disposing them.

[0003] European patent application No. 0005660 describes a device for disposing kitchen refuse in packages enclosed by flexible tubing derived from a tubular pack of tubing surrounding a tubular guide. The device includes a tube sealing mechanism. The tubing passes from the pack over the top of and then down the guide to a position beneath the guide where it has been closed by fusion to provide a receptacle within the guide means. When this receptacle is full of refuse, a lever is manually operated to actuate an electro-mechanical apparatus including clamping and fusion devices that travel round closed tracks to perform the four-fold task of drawing the receptacle down below the tubular guide, fusing the tubing walls together to seal the top of the receptacle, sealing the tubing walls together to provide the closed base of the next receptacle and dividing the tubing by heat at a location between these two fusion locations to separate the filled package.

[0004] A popular approach for disposing of diapers has been a device using, for example, a tube twisting mechanism to form a pouch about a diaper. Such a device is disclosed in U.S. Patent No. 4,869,049. The patent discloses an apparatus to form packets containing disposable diapers comprising a tubing which passes through the top edges of a core opening and then down through the core. The core is turned by means of a twist ring/drive (should be twist ring if this is talking about the current diaper genie) about a cylinder to twist the flexible material at locations between the adjacent packets to seal the packets at their ends thereby providing disposal of the waste. A manually rotatable cutter in the lid is provided for severing the flexible tubing above the twisted packets.

[0005] A commercially available waste storage device for disposal of baby diapers is known as the Playtex Diaper Genie®. In the Diaper Genie®, a waste storage container is fitted with a lid designed to contain odors when the lid is closed. The lid also has a rotatable cutting device designed to sever a storage film from a film cassette positioned in the waste container body. The film cassette having a hole concentrically located therein, is positioned in the waste container body. The film cassette has a top surface from which the storage film extends and has a removable twist drive placed in the concentric hole of the cassette. The storage film extends from the film cassette, over and then down through the twist drive, down through a hole in the film cassette and into the waste container body, all in the shape of a tube. The user manually opens the lid assembly by hand and places waste such as a diaper through the twist drive and hole in the film cassette, into the storage film tube. The twist drive is then manually rotated by the user's hand, which causes the film cassette and stored film to rotate, sealing off the disposed waste in the storage film to form a packet or a pouch with a continuous twisted link still attached to the storage film. The storage film is continuously fed from the film cassette as additional links of packets or pouches are formed. The last link is then severed from the storage film when the waste receptacle has been filled to capacity. This is accomplished by closing the lid and pressing down and rotating a rotatable cutting device accessible from the top of the lid, thereby severing the film from around the rim of the film cassette, now exposed in the absence of the twist drive.

[0006] The contents of the entire prior art references cited herein are incorporated by reference. From the above it can be understood by those having ordinary skill in the art that there are a number of disadvantages associated with prior art waste disposal devices using flexible tubing and tubular sealing material to form packets for disposal of waste materials. It will also be appreciated by those skilled in the art that the steps of placing and positioning the twist drive in the device first by opening a lid, then twisting the ring to seal the waste material inside the film tube, closing the lid, then reopening the lid, closing the lid again before cutting the film may be cumbersome and time consuming. It is clear that a device is needed that will eliminate these disadvantages. Such a device should be relatively safe, economical to purchase, and easy to operate with fewer interventions by the user.

SUMMARY OF INVENTION

[0007] The present invention provides a waste disposal apparatus and a method for disposing waste material. Specifically, the present invention is directed to an apparatus having a cutting tool integrated with a mechanism for twistably sealing and cutting a tubular sealing material containing waste, deposited in such sealing waste in a tubular sealing material to form a series of waste packages, and to the use thereof. The disclosed integrated twist-and-cut (ITAC) system provides an improvement over existing waste disposal systems by eliminating intervening steps of disposing waste material.

[0008] An embodiment of the present invention comprises an integrated cutting system for a waste storage receptacle. A container body defines a waste bin. An opening provides access to the waste bin. A support in the form of a collar resides adjacent the opening. The collar has a flange extending therefrom and is cylindrically configured for mounting a film cassette above the waste bin. The collar encloses less than all of the opening to the waste bin so that waste material can be passed through the opening and into the waste bin. The invention further comprises a film cassette mounted to the flange of the collar, and a lid hingedly adjacent the collar. The lid portion encloses a first device for a film sealing means for forming waste packets by twisting a flexible film tubing that is dispensed from the film cassette. The lid portion

also encloses a second device operably connected to the first device for cutting the waste packet from the film tubing.

[0009] Another embodiment of the present invention comprises an integrated cutting system for a waste storage receptacle. The waste storage receptacle has a body, a collar, a lid and a storage film cassette adapted to be positioned in the collar. The cassette has a continuous length of a tubular storage film therein. The invention further comprises a handle operably connected to the lid. The operation of the handle engages a cutting device and a film sealing device to uniform rotational motion, and twistably seals the film extending from the cassette. A button is also operably connected to the lid. The operation of the button disengages the sealing device from rotation and exposes the cutting device to the film in a stationary state. Further operation of the handle rotates a blade affixed to a blade shoe, the blade severing the film from the cassette.

[0010] Still another embodiment of the present invention involves a method for disposing waste material from a waste disposal apparatus. The method provides a lid having a sealing device and a cutting device therein. The sealing device is operable by a rotatable handle, and the cutting device by a button. A length of film tubing is provided. The tubing has a first sealed portion of the tubing at a location along its length and an open end. The method involves inserting, with the lid open, waste material through the open end of the tubing until it contacts the first sealed portion of the tubing; closing the lid; rotating the handle to rotate the sealing device and the cutting device simultaneously to only twist and seal the open end of the tubing; operating the button downwards and disengaging the sealing device; operating the rotatable handle to rotate the cutting device only, and cut the waste packet only; and discarding the waste packet from the waste disposal apparatus.

BRIEF DESCRIPTION OF DRAWINGS

[0011] *Figure 1* is a perspective drawing of the waste disposal apparatus of the present invention showing the primary parts, including the body, collar, rotatable handle, and cutting button of the apparatus.

[0012] *Figure 2a* is an exploded view showing the components of an embodiment of an integrated twist-and-cut (ITAC) system, according to the present invention.

[0013] *Figure 2b* is a schematic drawing of a tubing refill cassette, according to US Application No: 60/499,443.

[0014] *Figure 3a* is a partial cut-away of the apparatus of *Figure 1*, showing the forming of waste packets by twisting and sealing of a flexible material, according to the present invention.

[0015] *Figure 3b* is a cross-sectional view of the apparatus of *Figure 1*, showing the placement of a film cassette in relation to a rotary twist drive and a blade shoe, according to the present invention.

[0016] *Figure 4a* is a partial cross-sectional view of the apparatus of *Figure 1*, showing the position of the components of the ITAC system in twist mode, only.

[0017] *Figure 4b* is a partial cross-sectional view of the apparatus of *Figure 1*, showing the position of the components of the ITAC system in cut mode, only.

DETAILED DESCRIPTION

[0018] Referring now to *Figures 1, 2, 3a-3b* and *4a-4b*, there is shown one waste disposal apparatus embodiment of the present invention utilizing an integrated twist-and-cut system for packing and disposing of waste materials.

[0019] In *Figure 1*, reference numeral **10** generally represents a waste storage and disposal apparatus having a body **100**, a collar **200** and a lid **300**. Body **100** serves as a receptacle for temporarily storing waste materials introduced into

apparatus **10** through lid **300** and sealed in packets in the collar section **200**, as will be explained more in detail with reference to *Figures 2* and *3* below. Body **100** as shown is substantially cylindrical in shape. However, alternative shapes for body **100** can also be used including rectangular or cubical. Body **100** has a hinged base **105** and a latch **115** to lock and release the bottom base of the receptacle to provide access to stored waste products inside the receptacle. As would be understood by one of ordinary skill in the art, the hinged base **105** can be located at any other surface of body **100**, such as the side.

[0020] Collar **200** is substantially cylindrical in shape and has a diameter substantially the same size as at least one the diameter of body **100** to provide a sealing engagement of the collar with the body along the conjoining portions. If an alternative shape of body **100** is used, such as rectangular or cubical, then the corresponding mating shape would also be used for collar **200** to provide a sealing engagement of the collar with the body along the conjoining portions.

[0021] Lid **300** provides the function of housing the mechanisms for the ITAC system of the present invention. The lid and the integrated twist-and-cut system therein will be described more in detail in the preferred embodiments shown in *Figures 2*, *3a-3b* and *4a-4b* below. Lid **300** as illustrated is also substantially cylindrical in shape and has a diameter substantially the same size as the diameter of collar **200** to provide a sealing engagement of the lid with the top along the conjoining portions. Lid **300** is pivotally connected to collar **200** by a lid hinge preferably in the rear (not shown in *Figure 1*). Lid **300** has a lid slot **305** formed therein. Lid slot may comprise a button for ease of latching and unlatching. Lid slot **305** may be a u-shaped channel that is operably connected to a lid latch **205** to allow user to open and close lid **300**. Lid latch **205** is better seen in *Figures 2* and *3b* discussed below.

[0022] An aspect of an embodiment of the present invention involves a handle **310** operably interconnected to a button **320**, both formed in lid **300**, as shown in *Figure 1*. Handle **310** is configured to be mechanically rotatable by hand. Rotatable handle **310** engages and rotates in unison a rotary twist drive **360** and a cutting tool **370**. Thus, rotatable handle **310** performs not only the conventional function of forming

continuous waste packets **227**, such as shown in Fig. 3b, from a flexible film **223**, but also the function of severing the packets from the film; however, without having to open the lid and performing additional steps. This is accomplished, according to the present invention, by depressing button **320** which automatically disengages the rotary twist drive **360** and continuing with the rotating action of the handle only to expose now a nonmoving, stationary flexible film **223** to a rotating cutting tool **377**, such as a blade, as shown in *Figures 2 and 3b*.

[0023] Aspects of an embodiment of the present invention are shown in *Figure 2a*, which is an exploded view of collar **200** and lid **300** of *Figure 1*. Lid **300** is pivotally connected to collar **200** by a lid hinge at **207** preferably in the rear, as shown in *Figure 2a*. Lid **300** can easily be opened or sealably closed over collar **200** by engaging or disengaging lid latch **205** to and from lid slot **305**. Lid **300** is configured to house the various components of an integrated twist-and-cut, ITAC, embodiment system, including wave spring **330**, clutch plate **340**, yoke **350**, rotary twist drive **360**, and blade shoe **370**, as explained below in detail, so that, when opened, the lid carries with it all the ITAC components, and provides direct access to a flange **209** of the collar where a cassette of film is placed. Cassette **220** is shown in *Figure 3*.

[0024] Collar flange **209** is formed circumferentially about the inner circular wall **210** of the collar as shown in *Figure 2a*. Circular wall **210** extends substantially vertically upward from flange **209**. As used here, horizontal refers to the direction between collar latch **205** in the front and lid hinge **207** in the rear as oriented in *Figure 2a*, which is substantially perpendicular to the sidewalls defining collar **200**. Vertical refers to the direction between lid **300** and collar **200**. Circular wall **210** has a diameter larger than the diameter of cassette **220** as shown in *Figures 3a-3b* and *4a-4b* (not shown in *Figure 2a*). Circular wall **210** provides support for cassette **220** to prevent it from moving in a horizontal direction yet allowing it to rotate about the center of the collar.

[0025] Referring again to *Figure 3b*, cassette **220** stores the flexible film which emanates from the cassette through gap **225** and then fords flange **209** area (hidden underneath the film). Rotatable handle **310** then engages the rotary twist drive

360, thereby twisting the film **223** having waste material, such as a soiled diaper, garbage, etc. previously introduced into the film through the open lid, and sealing the film in a tubular form, thus sequestering the waste material in packets **227**. The same rotatable handle is then used to sever, for example, the last packet from the film of the cassette when receptacle **100** is full and ready to be emptied by releasing latch **105** in *Figure 1*.

[0026] In one embodiment of the present invention shown in the exploded view in *Figure 1*, rotatable handle **310** has a substantially round upper portion **311** and a cylindrical neck **313** which extends through all the openings centrally formed in the components of the ITAC system, in the order starting from lid **300**, wave spring **330**, clutch plate **340**, yoke **350**, rotary twist drive **360** and engages shoulder **373** of blade shoe **370**. Handle **310** is, therefore, capable of imparting rotational motion directly to blade shoe **370** with rim **375**. In one embodiment, it is preferred that the engagement of neck **313** to shoulder **373** is in the form of a split spline as shown in *Figure 2a*, although it will be understood by those skilled in the art that the engagement of the neck to the shoulder can be accomplished in different ways, including a press fit neck into a sleeve.

[0027] In an embodiment of an aspect of the invention, wave spring in *Figure 2a* comprises an undulating shape with opening **335**, and the undulating portions press upon the upper portion of lid **300** (not shown) when inserted about the neck **313**. The bottom surface of the wave spring has protrusions **333** as shown in the same *Figure*. It will be understood that springs of other shapes, including types of protrusions other than shown in *Figure 2a* can also be used. Protrusions **333** of the wave spring press against corresponding recesses (not shown) formed in a lower surface of clutch plate **340** shown in *Figure 2a*. Clutch plate **340** has an upper surface **341** in the form of a ring with geared teeth **343**. Teeth **343** engage rotatably with teeth located in lid **300** (not shown) when button **320** is depressed. The clutch plate locks the rotary twist drive **360** in place when button **320** is pressed.

[0028] In another embodiment of an aspect of the invention, clutch plate **340** has a plurality of vertical projections **345** formed on its lower surface, as shown in

Figure 2a. Vertical projections **345** of clutch plate **340** engage in corresponding openings **363** that are formed in rotary twist drive **360** shown in *Figure 2a*. In operation, any rotational motion imparted by handle **310** is transmitted to the blade shoe **370**, which is operably connected to the handle via neck **313** of the handle. In turn, vertical projections **345** of the clutch plate transmit the rotational motion to the rotary twist drive **360**. It will be noted in *Figure 2a* that the blade shoe **370** nests inside the dome-like cavity **365** under the rotary twist drive **360**, wherein blade **377** (there may be two or more blades although only one is shown in the diagram) is positioned coplanarly with ribbed surface **367** of the rotary twist drive. *Figure 2a*, therefore, shows an embodiment which may be employed in an aspect of the invention, wherein the rotation of handle **310** provides zero, or stationary, relative motion between the rotary twist drive **360** and the blade shoe **370**, thereby providing only a twisting action of the film **223** on the rim **250** of the cassette **230** shown in *Figures 2b* and *3a* to seal refuse previously deposited into the film, and form packets **227**. The cassette rim **250** contains ribs **260** (*Figure 2b*) that allow the twist drive teeth to engage it and rotate it.

[0029] A tubing refill cassette is shown in *Figure 2ab* as cited in US Application 60/499,443. A rotary grip ring or a rotary twist drive may be used to rotate the cassette body **230** effectively twisting the flexible tubing **240** which emanates through a gap **245** between rim **250** of cassette **230** and the open cassette core area **235**, and is folded down through the open cassette core area **235** into an interior bin space. The bottom rim **230** of the film cassette rests on several glide buttons that are affixed, for example, to the flange support which may be affixed to the internal wall side of a waste bin. Glide buttons alleviate friction between the bottom of cassette body **230** and the surface it rests on, and allow the refill to freely rotate in the body **100**.

[0030] Another aspect of the present invention involves a yoke **350** positioned between clutch plate **340** and rotary twist drive **360**. Yoke **350** is generally u-shaped having lateral projections **351** and a curvilinear shoulder **353**, as shown in *Figure 2a*. In assembly, lateral projections **351** straddle vertical projections **345** of clutch plate **350** and slidably press against the lower surface **347** of the clutch plate.

The curvilinear portion of shoulder **353** protrudes beyond the periphery of the clutch plate **340** to accommodate the seating of a button **320** in a recess **355** on the shoulder of the yoke, without interference by the clutch plate. Button **320** is operably connected to lid **300**, and is better seen in *Figures 4a and 4b*. In its normal position, that is, when the button is not depressed as seen in *Figure 4a*, vertical projections **345** can rotate freely in between lateral projections **351** when set into motion by rotating handle **310**, thus also rotating the rotary twist drive **360**, as described above. Rotary twist drive **360** has a drive collar **361** with a plurality of openings **363** corresponding to the plurality of clutch plate projections **345** which engage the openings to rotate the rotary twist drive **360**. *Figure 4a* shows a cross-sectional view of the positions of the components of the ITAC system in the twist mode, only.

[0031] An embodiment of an aspect of the present invention provides a means for lifting the clutch plate vertically and disengaging the vertical projections **345** of the clutch from openings **363** in the rotary twist drive **360**, thereby allowing only the blade shoe **370** to rotate when set into motion by rotating handle **310** and sever the flexible film **223** from the rim of the cassette, as shown in *Figures 3a and 3b*. This function is provided by button **320**, which, when depressed, causes the shoulder **353** of the yoke to move downward, while moving the lateral projections **351** upwards to lift the clutch plate **340**. It will be noted that in the absence of any twisting action, flexible film **223** in *Figures 3a and 3b* remains stationary, and hence the relative motion between the blades **377** and film **223** will cut the film. Although it may be preferred that a pair of diametrically opposed blades be used along the periphery of the circular blade shoe **370** of the invention, it will be understood by workers in the field that any plurality of various shapes of blades can also be used.

[0032] *Figure 4b* shows a cross-sectional view of the positions of the various components of the ITAC system in the cut mode, only. Specifically, it will be noted that button **320** is pushed downwards into lid **200**, and yoke **350** is tilted so that vertical projections **345** of clutch **340** are lifted out of the recesses **363** of the rotary twist drive **360**.

[0033] While the invention has been particularly shown and described with reference to particular embodiments, those skilled in the art will understand that various changes in form and details may be made without departing from the spirit and scope of the invention. For example, the handle and button operations can be automated. Furthermore, an indent can be provided for the button so that one need not hold down both the button and the handle during the cutting operation. Also, a number of clicks can be incorporated to the turning of the rotatable handle to signal positively the end of twisting of the film material in forming waste packets. In addition, a sighting can be provided to show the waste bin reaches the full capacity. Cutting blade shown in *Figure 2a* can also be made replaceable for ease to the user as depicted by blade cartridge 379 in the same *Figure 2a*.